Chapter V

An Agent-Oriented Perspective on E-Bidding Systems

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Abstract

Today, a high volume of goods and services is being traded using online auction systems. The growth in size and complexity of architectures to support online auctions requires the use of distributed and cooperative software techniques. In this context, the agent software development paradigm seems appropriate both for their modeling, development and implementation. This chapter proposes an agent-oriented patterns analysis of best practices for online auction. The patterns are intended to help both IT managers and software engineers during the requirement specification of an online auction system while integrating benefits of agent software engineering.
The emergence and growing popularity of electronic commerce in general and online auctions in particular, has raised the challenge to explore scalable global electronic market information systems, involving both human and automated traders (Rachlevsky-Reich, Ben-Shaul, Tung Cho, Lo, & Poggio, 1999).

Online auctions are a particular type of Internet-based electronic markets, that is, worldwide-open markets in which participants buy and sell goods and services in exchange for money. Most online auctions rely on classical auction economics (Beam & Segev, 1998; Bikhchandani, de Vries, Schummer, & Vohra, 2001S). In the economics literature, “an auction is an economic mechanism for determining the price of an item. It requires a pre-announced methodology, one or more bidders who want the item, and an item for sale” (Beam & Segev, 1998). The item is usually sold to the highest bidder. An online auction can be defined as an auction which is organized using an information system and is accessible to auction participants exclusively through a Web site on the Internet.

Recently, online auctions have become a popular way to trade goods and services. During 2002, the leading online marketplace, eBay.com, provided a trading platform for 638 million items of all kinds. The value of all goods that were actually traded amounted to nearly $15 billion, which represented, at the time, a third of all online sales in the U.S. This trend results from specific advantages of online auctions over traditional ones, as well as the fact that people are becoming increasingly comfortable with online shopping, which is reflected in strong growth of online sales, on both auction-based (e.g., eBay.com) and other e-commerce platform types (e.g., fixed-price marketplaces, such as Amazon.com).

Today, with the increasing number of online auctions being organized, there is a need for distributed, large-scale and dynamic information system (IS) architectures to support online auction marketplaces (Rachlevsky-Reich, Ben-Shaul, Tung Chau, Lo, & Poggio, 1999). From the information system development perspective, multi-agent systems (MASs) are a powerful new software engineering paradigm for designing and developing complex information systems (Yu, 1997). The use of agents as intentional, autonomous, and social entities which act according to their self-interest (Yu, 2001) provides advantages in both the modelling of an online auction system, and in its implementation using an agent-oriented IS.

In this chapter, we propose agent-oriented analysis patterns for an online auction information system (OAIS). These patterns are intended to help both IT managers and software engineers during the analysis of OAIS. We develop the social dimension of patterns on the basis of the analysis of leading existing online auction information systems.

Our motivation stems from the fact that auction mechanisms for exchanging goods and services will become more and more popular with both consumers and companies.